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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/600,571

06/23/2003

Masao Hori

HARA-072-046

9645

20374

7590

08/15/2006

KUBOVCIK & KUBOVCIK

SUITE 710

900 17TH STREET NW

WASHINGTON, DC 20006

EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/600,571

Applicant(s)

HORI ET AL.

Examiner

Tu M. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 and 11-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 11-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 08/875,577.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>20060509</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. An Applicant's Amendment filed on June 7, 2006 has been entered. Claims 9-10 have been canceled; claims 1 and 11 have been amended; and claims 15-16 have been added. Overall, claims 1-8 and 11-16 are pending in this application.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katoh et al. (U.S. Patent 5,402,641) in view Leyer et al. (U.S. Patent 5,643,542).

Re claims 1 and 11, as illustrated in Figures 1 and 5, Katoh et al. disclose a process for purifying exhaust gas from lean burning internal combustion engines, comprising the steps of:

- preparing an exhaust gas purifying-use catalyst (6) for purifying first exhaust gas produced under a driving condition at which an air-fuel ratio is stoichiometric (see lines 3-8 of the Abstract), the exhaust gas purifying-use catalyst consisting essentially of a noble metal (platinum, line 65 of column 3) and a fire-resistant inorganic oxide (active alumina, line 62 of column 3) carrying the noble metal, the fire-resistant inorganic oxide being active alumina; and

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- purifying exhaust gas from a lean burning engine by contacting the exhaust gas with the single exhaust-gas purifying-use catalyst (6); and

wherein the exhaust gas varies between the first exhaust gas (stoichiometric or rich air-fuel ratios) having an exhaust-gas temperature in a range of 350 to 800°C at an inlet of the catalyst (step 106 with YES answer and step 108), and a second exhaust (lean air-fuel ratios) that forms a more oxidizing, low-temperature atmosphere as compared with the first exhaust gas, depending on changes in air-fuel ratio, and

wherein the second exhaust gas is controlled so as to have an exhaust-gas temperature which is lower than the first exhaust gas, and which is in a range of 200 to 350°C at the inlet of the catalyst (step 106 with NO answer and step 110).

Kato et al., however, fail to disclose that their engine is a gasoline fuel-direct-injection type engine which allows fuel to be directly injected inside a cylinder of the engine; and that an amount of the noble metal being in a range of 0.01 to 50 g/liter with respect to the catalyst volume, an amount of the fire-resistant inorganic oxide being about 50 to 300 g/liter with respect to the catalyst volume, and a water-soluble compound being used as a source of the noble metal.

Kato et al. disclose the claimed invention except for applying the invention to a gasoline fuel-direct-injection type engine. It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the invention of Kato et al. to a gasoline fuel-direct-injection type engine, since the recitation of such amounts to an intended use statement. Note that a gasoline fuel-direct-injection engine also generates exhaust gases containing harmful emissions of HC, NO<sub>x</sub>, soot, CO, and SO<sub>x</sub>, that require purification before the gases can be released to the atmosphere; and the mere selection of the purification process of Kato et al. for

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use in a gasoline fuel-direct-injection engine would be well within the level of ordinary skill in the art.

As indicated in the Abstract and in the claims, Leyrer et al. teach a NO<sub>x</sub> conversion catalyst adapted to purify hydrocarbons, carbon monoxide, and NO<sub>x</sub> in the exhaust gas of an internal combustion engine. The NO<sub>x</sub> conversion catalyst comprises a catalytically active coating having a platinum metal group and a high surface area support material (claim 1). The platinum metal group is in a range of 0.01 to 5 g/liter of the catalyst volume (claim 9) and is obtained from a water-soluble compound (lines 38-49 of column 5, line 6 of column 7). The high surface area support material is a fire-resistant inorganic oxide (aluminum oxide/silicon oxide) in a range of about 200 g/liter with respect to the catalyst volume (lines 1-3 of column 7). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the amounts of platinum and inorganic oxide taught by Leyrer et al. in the catalyst of Katoh et al., since the use thereof would have provided a catalyst having high efficiencies in removing HC, CO, and NO<sub>x</sub> in the exhaust gas.

Re claim 2, in the modified process of Katoh et al., the exhaust gas is purified by removing hydrocarbon, carbon monoxide, and nitrogen oxides from the exhaust gas by the use of the catalyst (6).

Re claims 3-4, in the modified process of Katoh et al., the first exhaust gas state appears when the air-fuel ratio is in the range of 13 to 15 (stoichiometric or rich air-fuel ratios), and the second exhaust gas state (lean air-fuel ratios) appears when the air-fuel ratio exceeds the above-mentioned air-fuel ratio, wherein the second exhaust gas state appears when the air-fuel ratio ranges from more than 15 up to 50.

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Re claim 5, in the modified process of Katoh et al., the catalyst (6) includes at least one kind of noble metals, selected from the group consisting of platinum, palladium, rhodium, and iridium.

Re claim 6, in the modified process of Katoh et al., the catalyst (6) includes platinum (line 65 of column 3).

Re claim 7, in the modified process of Katoh et al., the catalyst (6) further comprises a transition metal (vanadium) (see claim 5 of Leyrer et al.), an amount of the transition metal being in a range of 0.01 to 50 g/liter with respect to the catalyst volume (see claim 9 of Leyrer et al.), and a water-soluble compound being used as a source of the transition metal contained in the catalyst (lines 50-55 of column 5 in Leyrer et al.).

Re claim 8, in the modified process of Katoh et al.,

- the gasoline engine includes obviously a cylinder that serves as a combustion chamber for gasoline as a fuel; an ignition plug (not shown but obviously must have); an injector (not shown but obviously must have) that is used for injecting the fuel; a control section (8) for controlling an ignition timing of the ignition plug and an amount of fuel injection of the injector, and

- the control section (8) controls an air-fuel ratio depending on the injector so as to cause the gasoline engine to be in the second exhaust gas state.

Re claim 12, in the modified process of Katoh et al., the catalyst further contains, as a co-catalyst, a rare-earth metal (line 67 of column 3).

Re claims 13-14, in the modified process of Katoh et al., the single exhaust-gas purifying-use catalyst that consists essentially of a noble metal (platinum) is obtained by impregnating a noble metal in the fire-resistant inorganic oxide.

Re claim 15, in the modified process of Katoh et al., the second exhaust gas (lean air-fuel ratios) is controlled so as to have an exhaust-gas temperature in a range of 200 to 300°C at the inlet of the catalyst (step 106 with NO answer).

4. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katoh et al. in view Leyer et al. as applied to claim 1 above, and further in view of legal precedent.

The modified process of Katoh et al. discloses the invention as cited above, however, fails to disclose that the second exhaust gas is controlled so that an exhaust-gas temperature of the second exhaust gas is at least 200°C lower than an exhaust-gas temperature the first exhaust gas, at the inlet of the catalyst.

Katoh et al. disclose the claimed invention except for specifying that the second exhaust gas is controlled so that an exhaust-gas temperature of the second exhaust gas is at least 200°C lower than that for the first exhaust gas. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum value of the second exhaust gas temperature, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

***Response to Arguments***

5. Applicant's arguments with respect to the reference applied in the previous Office Action have been fully considered but they are moot in view of the new ground(s) of rejection.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

***Prior Art***

7. The IDS (PTO-1449) filed on May 9, 2006 has been considered. An initialized copy is attached hereto.



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8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of one patent: Araki et al. (U.S. Patent 5,404,719) further disclose a state of the art.

*Communication*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Tu M. Nguyen*

TMN

August 11, 2006

Tu M. Nguyen

Primary Examiner

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